Land Taxes: From Theory to Practice

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Land Value Taxation

"In my opinion, the least bad tax is the property tax on the unimproved value of land, the Henry George argument of many, many years ago."

—Milton Friedman,The Times Herald, Pennsylvania, 1978

Land Value Taxation

- Rich theoretical literature on land value taxation (LVT)
  - Switching to LVT promotes economic activities and raises revenue with little distortions.
- Split-rate taxation as a variant of LVT in practice
  - Lowering the tax rate on structures would encourage capital intensity of land development (Brueckner, 1986).
  - Such taxes would be most effective in cities with a large share of renters and in cities in which people are willing to substitute structures for land in their housing bundle (Murphy and Seegert, 2024).

LVT Implementation in PA

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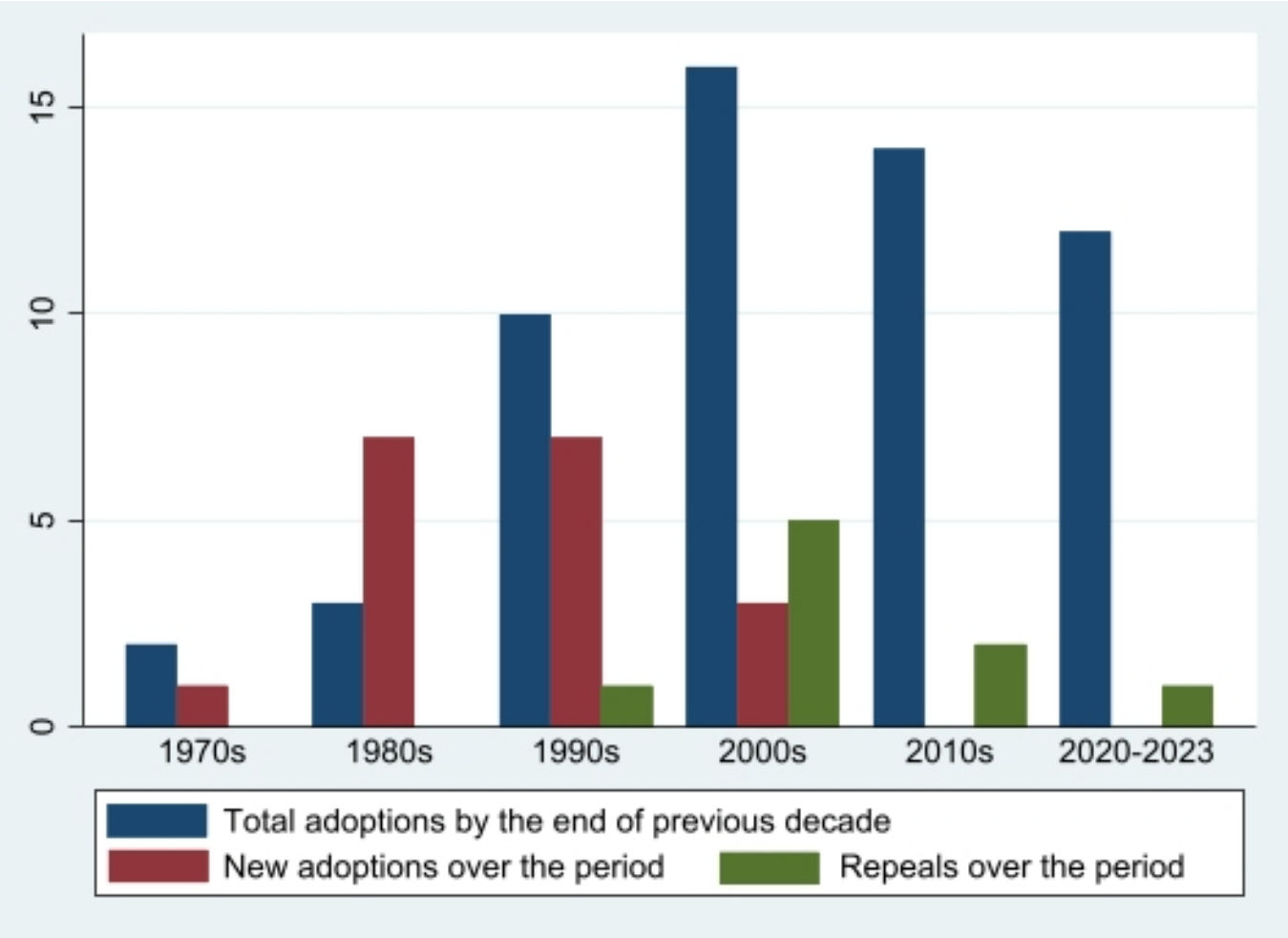


Policy Reversals over Recent Decades

- Nine municipalities switched back to traditional property taxation by 2023, including Pittsburgh.
- Assessment problems and a lack of understanding seemed to contribute to the policy reversals.
  - Pittsburgh: Inaccurate assessments and inappropriate rate adjustment procedures; escalated by a countywide reassessment (Bourassa, 2009)
  - Connellsville/Oil City: Outdated assessments/long overdue reassessments and inaccurate breakdowns of assessed values (Bourassa, 2009)
  - Altoona: Many believed that the land value tax did not help much (the city tax bill only accounts for a relatively small portion of the total tax bills for local residents; lack of understanding of the tax structure).

Empirical Evidence Based on the PA Experience

- Early empirical studies on the PA experience
  - Findings: increased building activity, rising capital/land ratio, increased population and housing density (Oates and Schwab, 1997; Plassmann and Tideman, 2000; Banzhaf and Lavery, 2010)
- Recent empirical studies exploring additional policy variation
  - Larger estimated impact on capital/land ratio with improved model specifications
  - Additional evidence (effects on land value, business establishments, tax base and spillover effects)

Policy Implications: Lessons Learned from the PA Experience

- Appropriate assessment practices are crucial to the implementation.
- After the initial adoption, additional rate adjustments should follow the theoretical implications.
  - Raising land and building tax rates at the same time is unlikely to result in desirable outcomes (Yang, 2014, 2018; Yang and Hawley, 2022).
- Effectively educating the public about LVT is necessary.

Split rate and its limitations

- In U.S., "split rate" is the only land tax design in use, but it is not clearly recommended by theory
- Only reducing future tax costs of investment would be more efficient
- Factors restricting other approaches:
  - Vertical fragmentation of taxing jurisdictions
  - Constitutional constraints on property taxes
  - Political viability of tax reform

A casual model of property tax reform

$$\max\{E(T)\} \mid T \geq \alpha \, , G(T) \geq \beta$$

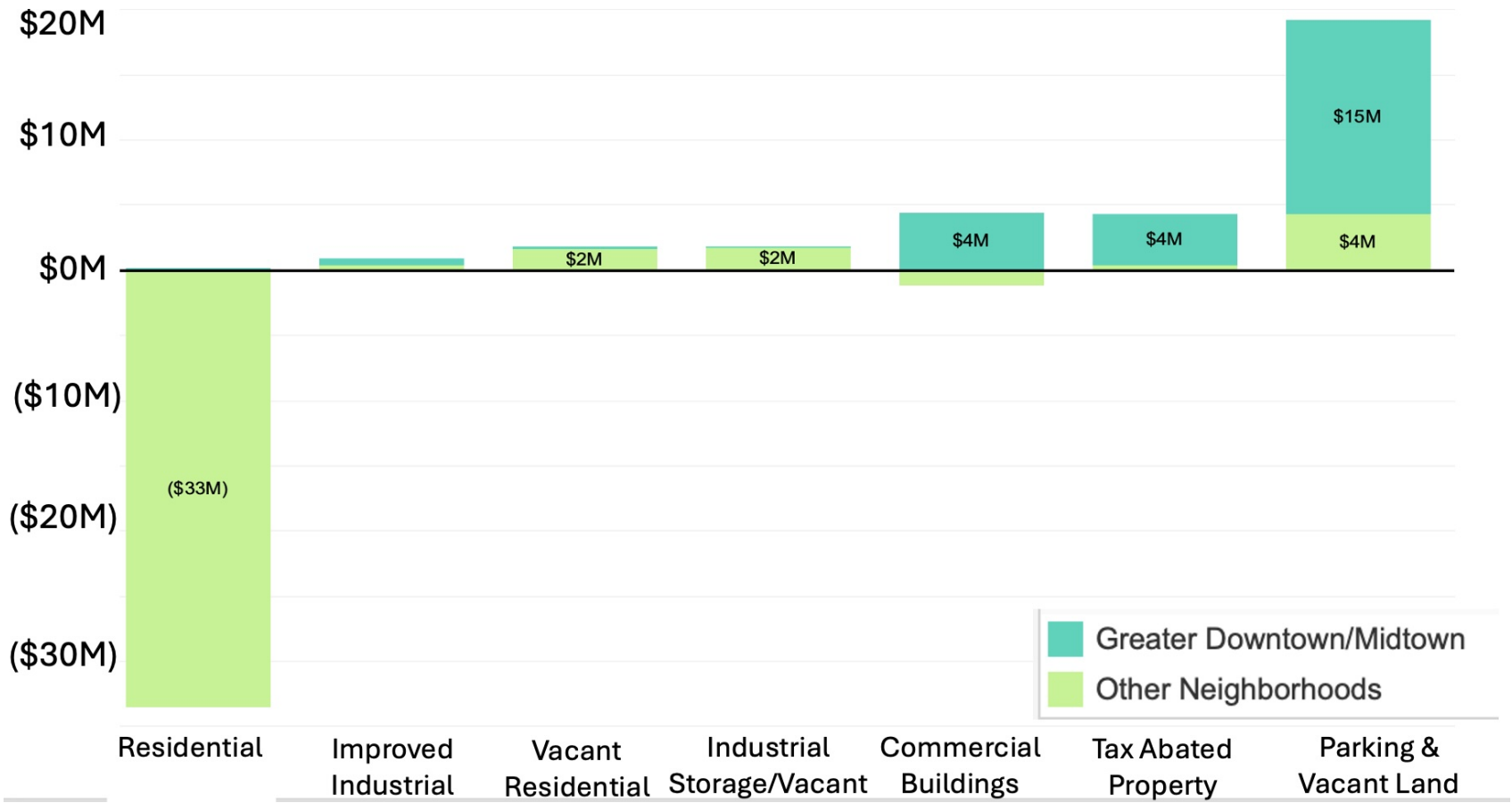
- T = tax policy
- $E(T)$ = efficiency
- $G(T)$ = expenditure
- α = legal thresholds
- β = voter threshold

Where does split rate work?

Split rate reform with revenue neutrality and no capitalization

- Split rate compensates existing building owners/occupants
- Only the intensity of reallocation can be adjusted
- Freezing the initial allocation limits local viability
  - Some local simulations find income regressivity
  - England and Zhao (2005), Bowman and Bell (2008), Plummer (2010)

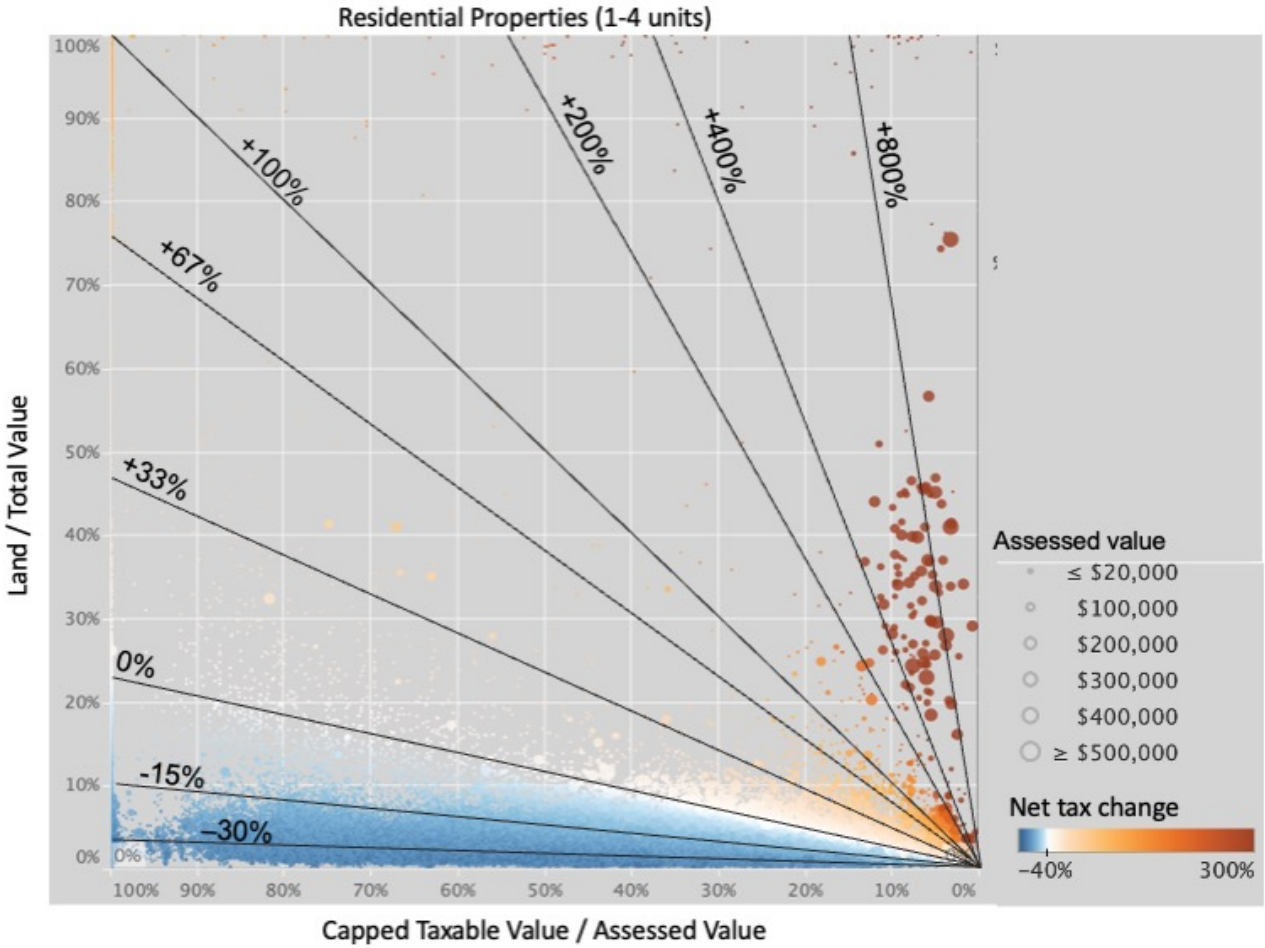
Y1 static tax shift in Detroit (3:1 rate ratio)



Messy policy interactions with land taxes

- Fixing land quantities by land use creates horizontal inequities
  - Ex. parking minimums with grandfathering rules
- Land taxes interact with existing property tax distortions
  - Ex. assessment caps on taxable value

Interaction with assessment shelters



A policy alternative not adopted

Improving land tax mechanism design

- LVT behavior under policy distortions (e.g. tax privileges, land use regulations)
- More general LVT implementation mechanisms
  - Flat exemptions of property value
  - Spending on public goods with concentrated location value
  - Conditions for full Kaldor-Hicks compensation
- Options to enact land taxes outside of ad valorem property tax framework

Prevailing Valuation Methods

- Assessors in jurisdictions where the total values of properties are needed to implement a traditional single-rate property tax do not need to value land and structures separately.
- In cases where distinct land values are needed, assessors face the challenge of a limited numbers of vacant land sales by which to estimate land values for subject properties. Due to small sample sizes their estimates may be imprecise.
- There are also concerns over sample selection bias because those vacant parcels may not be representative. Another possible method is to use vacant land sales from an adjacent jurisdiction, which brings concerns over comparability.
- Some assessors simply allocate a fixed proportion of the total value of a property to the land (e.g. 20 percent).

The Challenge of Land Valuation

- Implementation of LVT or a split-rate tax depends crucially on the ability to disentangle land and structure values.
- The literature on the *non*-neutrality of land taxation relies on the assumption that assessments are related to market values. The models of non-neutrality assume that they are related. See Anderson (1986), Bentick (1979), Mills (1981).
- Tideman (1982) contended that a tax on land value *is* neutral. That conclusion relies on the assumption that, "...the value of land is defined independently of how the land is actually used."
- If assessments are aligned with actual land use, at least partially, then land taxes are *not* neutral and they have efficiency effects.

Option value estimation

- A promising new method is the real options approach where estimation of the net present value (NPV) of a property includes the potential opportunity cost of a lost option.
- This depends on two characteristics of any investment: irreversibility and timing. With each investment decision, the investor has an option to invest or not. The call option involves the right, without obligation, to invest or modify an asset. The value of the asset includes this option value.
- Applied to real estate, there are both development and redevelopment options. The value of vacant land in an urban area includes the option value to develop that land and the value of a developed parcel includes the option to redevelop by modifying the structure.

Option value estimation

- An option value estimation strategy can be implemented using traditional hedonic methods, with modifications including development intensity variables.
- The first intensity variable we use is the interior square footage of property relative to the average interior square footage of neighbors. This is a relative measure of the condition of the property with respect to the neighborhood.
- The second intensity measure we uses current technological resources to include volume as a three-dimensional measure of the property infrastructure development, equal to the ratio of the volume of a property to the average volume of all properties within 0.5 mile of the subject property.

Hypotheses tested

- H1: Increased land use intensity decreases property prices, suggesting a rise in option value.
- H2: The devaluing effect of land use intensity on price intensifies with property age, indicating a greater option value for older properties.
- H3: Higher neighborhood blight scores diminish the option value, with the impact of intensity on price being less adverse in areas with more blight.

Option value estimation

- Initial results using Detroit data indicate that in cases where investors have full option value to redevelop, sales prices of properties rise by 34 to 52 percent.
- Furthermore, when option value is included as an inverse function of land use intensity, a predicted land value can be estimated. We can then compare those land values to assessed values.
- This method holds the prospect of giving assessors a practical tool to accurately estimate urban land values.

Is valuing land too daunting?

Mills (1998):

"Estimating and even defining raw land values is not a simple matter even at the conceptual level . . . My reluctant conclusion is that a land tax, substantially substituted for the existing property tax, is theoretically extremely attractive but practically almost worthless."

Land Quantity Taxes

Land Quantity Tax (LQT): sidestepping land valuation challenges.

- Tax rate per unit of land:
  - Tax revenue target T
  - Amount of land in jurisdiction L

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Unit cost of land:

$$\underbrace{r_j}_{\text{Land price}} + \underbrace{r_j \tau_V}_{\text{Land Value Tax}} + \underbrace{\tau_Q}_{\text{Land Quantity tax}}$$

Equivalence between LQT and LVT

Housing H produced with land L and structures S:

$$H = \left(L^{\frac{\gamma-1}{\gamma}} + S^{\frac{\gamma-1}{\gamma}} \right)^{\frac{\gamma}{\gamma-1}},$$

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Unit cost of housing (in absence of property taxes):

$$c_H = \left[r^{1-\gamma} + p_S^{1-\gamma} \right]^{\frac{1}{1-\gamma}},$$

Property Taxes

Property Tax:

$$c_H = \left[(r(1+\tau_P))^{1-\gamma} + (p_S(1+\tau_P))^{1-\gamma} \right]^{\frac{1}{1-\gamma}},$$

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Property Taxes

Split Rate Tax:

$$c_H = \left[(r(1+\tau_V))^{1-\gamma} + (p_S(1+\tau_S))^{1-\gamma} \right]^{\frac{1}{1-\gamma}},$$

Land Quantity Tax (LQT):

$$c_H = \left[(r+\tau_Q)^{1-\gamma} + (p_S(1+\tau_S))^{1-\gamma} \right]^{\frac{1}{1-\gamma}},$$

Equivalence between LQT and LVT

Assumption (for now): Land is homogenous across jurisdiction (price r).

Optimal ratio of structures-to-land:

$$\frac{S}{L} = \left(\frac{r(1+\tau_V)+\tau_Q}{p_S} \right)^{\gamma}, \tag{1}$$

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Effects on behavior are identical $\Rightarrow$ Taxes are equivalent.

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Is this a concern?

- No, in absence of distributional (equity) considerations
  - Land and home prices will eventually adjust so that households are indifferent over locations with different amenity values

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Solution 2: Nonlinear LQT rates.

- Charge higher rates for larger plots of land.
- Works best in jurisdictions where rich households tend to live on larger plots.

LQT could be more progressive than existing Property Tax